

tion, with little or no practical work, contenting himself by adding thirty-eight exercises at the end of the chapter. These exercises leave little to be desired, but a beginner will not always be clear about the several steps by which he is to arrive at the required result. The divisions adopted by the author lead to some very miscellaneous chapters; thus Chapter vi., entitled "Changes Belong to Several Classes," runs to thirty-two pages, and includes a brief treatment of inertia, the electrophorus, voltaic cells, the thermopile, gravitation, expansion, the Gulf Stream, Trade winds and several other subjects. Chapters viii. and ix. take the pupil "along the well-beaten track of chemical rudiments," and were written by Mr. F. Collins. Too much is attempted in this section, and things are often taken for granted of which a beginner has no knowledge whatever. Thus, on p. 185, the modes of chemical action are partly explained by chemical equations, though the only guidance towards understanding them which has been given to the pupil is the table of elements, with their symbols and atomic weights, on p. 181. The value of the book would have been much increased by using simpler language, and adding more illustrations.

Elementary Practical Chemistry. By A. J. Cooper, B.A., B.Sc. Pp. viii + 86. (London: Whittaker and Co., 1899.)

SOME idea of the profound changes which have occurred in the teaching of elementary chemistry during the last decade can be obtained from the large number of books recently published, all of which claim to supply a long-felt want. Mr. Cooper's book covers familiar ground in a more or less familiar way. He starts with a brief account of the metric system (which, however, is too short to be of much use), describes the balance, how to determine relative densities, and to measure liquids and fit up apparatus. No wonder the student often asks why these subjects must be studied both in the chemical and physical laboratories. But like many another recent writer of an elementary course of chemistry, Mr. Cooper rightly avoids the thaumaturgic art of test-tubing, and it is in this connection we are able to perceive an advance has been made in the way of studying science. Though the "Heuristic" method, of which so much is heard nowadays, is not suitable throughout a complete course of chemistry, it is unfortunate that so many statements occur like "note the white powder of metastannic acid that is formed"; "the name of the gas which you have just prepared is nitrous oxide"—which have no significance to a beginner.

The Teaching of Geography in Switzerland and North Italy. By Joan Berenice Reynolds. Pp. xii + 112. (London: C. J. Clay and Sons, 1899.)

NO more hopeful indication of the growing desire on the part of British teachers to improve the methods of instruction in our schools could be desired than this little volume provides. It is particularly gratifying to find that the old insular prejudice is giving place to an intelligent study of foreign educational systems, and that it is at last becoming recognised there is much to be learnt from Continental pedagogic authorities. Miss Reynolds was, in 1897, awarded the Travelling Studentship for Teachers in connection with the University of Wales, and her report, which she presented in 1898 to the Court of this newest of our Universities, demonstrates conclusively that she made the best use of her opportunities. Equipped with the information provided by a wide course of reading in the geographical literature of the countries she intended to visit, Miss Reynolds was able to intelligently note all the features of Swiss and Italian teaching practice which would prove of assistance to our own teachers, and she has here set them down in a clear and interesting manner. Her book should be read by every teacher of geography.

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Liverpool Marine Biology Committee's Memoirs. I. Ascidia. By Prof. W. A. Herdman, D.Sc., F.R.S. Pp. v + 52; with five plates. (Liverpool: T. Dobb and Co., 1899.)

THIS is the first of a series of memoirs which is being prepared by the Liverpool Marine Biology Committee under the editorship of Prof. Herdman, to supply a want which "has been constantly felt of a series of detailed descriptions of the structure of certain common typical animals and plants, chosen as representatives of their groups, and dealt with by specialists." The expense of preparing the plates in illustration of the first few memoirs is being met by a donation of Mr. F. H. Gossage, of Woolton. Prof. Herdman has omitted detailed references to original memoirs, the object of his manual being more to provide students of marine biology with a concise and accurate description of the appearance, structure, and life-history of the Ascidian than to publish a bibliography.

In an appendix a statement is given of the classification and characters of the Tunicata, in order to indicate the position of *Ascidia* as a type of the group and its relations to the other British Ascidians.

The Story of the Wanderings of Atoms, especially those of Carbon. By M. M. Pattison Muir, M.A. Pp. 192. (London: George Newnes, Ltd., 1899.)

AN attractive title does not by itself make an attractive book. Assuming that "The Library of Useful Stories" is intended for the general reader, we are afraid that this short account of the compounds of carbon is largely beyond his comprehension. There is an abundance of information, but the repeated references to Mr. Muir's "Story of the Chemical Elements" will tantalise the man who expects to get knowledge and recreation by the same process. A sound knowledge of organic chemistry is only obtained by experimental methods based upon a thorough grounding in the elements of chemistry, and this end is most satisfactorily obtained by studying simple inorganic substances first. The author has adopted a style more suited for the classroom than the platform of the popular lecturer, and the ordinary person who takes up this little volume will, after reading very few pages, find himself completely out of his depth.

General Index, by Robert Newstead, F.E.S., Curator of the Grosvenor Museum, Chester, to Annual Reports of Observations of Injurious Insects, 1877-1898. By Eleanor A. Ormerod, F.R. Met. Soc., &c. With Preface by the author. Pp. xii + 58. (Simpkin, 1899.)

THE twenty-two annual volumes of Miss Ormerod's Reports are known to all students of agricultural entomology, and their usefulness as indispensable works of reference will be largely increased by the present compendium, which includes, in addition to the general index, separate indices of plants, animals and unclassified "hosts." Miss Ormerod's preface contains remarks on the origin and method of the reports, notices of a few of the more important insects which have been dealt with, and miscellaneous observations. It is worthy of special note that she considers all birds which are even moderately insectivorous as beneficial to such an extent as to overbalance any mischief they may do in other ways, unless they are present in overwhelming numbers; but she especially excludes the house sparrow, which she denounces as a national evil.

W. F. K.

A Hand-List of the Genera and Species of Birds. By R. Bowdler Sharpe, LL.D. Vol. I. Pp. xxi + 303. (London: Printed by order of the Trustees of the British Museum, 1899.)

THE system of classification adopted in this new "hand-list" is that proposed by Dr. Bowdler Sharpe in 1891. The book is founded upon the "Catalogue of the Birds

in the British Museum," a large part of which was written by Dr. Sharpe, but the new species described since the publication of the twenty-seven volumes which comprise the "catalogue" are here included. Proofs of the work have been read and corrected by a number of leading ornithologists throughout the world, assistance sufficient, as Dr. Sharpe says, to give the work "the importance of an international publication."

Human Nature: its Principles and the Principles of Physiognomy. By Physicist. Part ii. Pp. viii + 175. (London: J. and A. Churchill, 1899.)

THE nature of the volume can be indicated by stating one of the propositions of the author's theory of colour: "That exhausted viable matter absorbs the luminous rays, and reflects the invisible (potential) rays, therefore it is dark or nearly colourless, sometimes violet or purple being perceptible; and that viable matter stored with energy reflects the luminous rays, therefore it is yellow or some colour containing excess of yellow, as brown, or cream colour, &c., and absorbs the invisible or potential rays."

LETTERS TO THE EDITOR.

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The Cause of the Darjeeling Landslips.

PROF. JOHN MILNE'S prompt contradiction in the *Times* of October 3, and in *NATURE* (5th) of the telegraphic statement concerning the cause of the recent Darjeeling landslips is a distinct "score" for the seismograph. With the Committee appointed by the Bengal Government to investigate the causes of the recent disaster, and to formulate measures for anticipating its possible recurrence, I made special inquiries into the alleged occurrence of earthquakes at Darjeeling on the night of September 24-25, and we all agreed that there was no evidence to show that any seismic phenomena whatever occurred. No movements were felt in well-built houses, and those that were noticed, as well as the sounds which were heard during the violent cyclone, were only of a kind that might be expected in the ill-built, rickety structures which, for the shelter of those who temporarily reside in our hill stations, are known to their owners as "houses." Local earth-tremors may have resulted from the slips, but they were the effects, not the cause, of the latter.

The unprecedented rain which accompanied the September cyclone was a sufficient and satisfactory immediate cause for the numerous landslips near and in Darjeeling. Up to the morning of the 23rd, the monsoon rains measured some 17 inches in excess of the average for previous years, and the thick soil-cap was consequently already saturated. The cyclonic depression first reported by the Meteorological Department to be formed to the south-east of False Point in the Bay of Bengal moved northwards until its centre, on the 24th, had reached lat. 25°, causing heavy rain over most of the province. During the twenty-four hours ending at 8 a.m. on the 23rd, 5·31 inches of rain fell at Darjeeling, followed by 19·40 inches during the next twenty-four hours. Of the latter amount 14·32 inches fell between 4 p.m. on the 23rd and 4 a.m. on the 24th, being thus over an inch an hour for a stretch of twelve hours. It was during this last period, when the rainfall was at its heaviest, that the disastrous slips occurred.

The hill-sides in the neighbourhood of Darjeeling are by natural means already at or near their angle of repose for earth-slopes, and the reduction of frictional stability, due to the thorough saturation by the heavy rainfall of September 23-24, was sufficient to permit slipping of the less stable portions of the soil-cap. The biotite-gneiss massif below is undisturbed and perfectly stable: there is nothing here comparable to Naini Tal, where the slates, by differential movement along their bedding planes, have caused cracks in the masonry structures built upon them. In Darjeeling the slips were confined entirely to the soil-cap, which ran down the steep hill-sides as rivers of mud,

and, with occasional included boulders, bombarded the back quarters of some of the houses. A more interesting example on the eastern side of the Jalapahar ridge shows movement on a comparatively large scale now in progress. The sides of the moving mass are defined by longitudinal shear cracks, whilst its upper region—the *Abrissgebiet* of Heim—shows gaping fissures with, in the uppermost ones, a vertical displacement of about 8 feet. A description of this interesting landslip, with map and photographs, will be issued at a later date by the Geological Survey Department.

T. H. HOLLAND,
Geological Survey of India, Calcutta, November 8.

Barisal Guns.

I MUST first state how I came to notice this phenomenon so well known in Bengal. Early in February, 1890, I was posted to Backergunge, as District Superintendent of Police, and remained there till December, 1891, a period of twenty-two months. In order to travel quickly over the district a steam launch was always at my service, and as I had to visit each of the numerous police stations scattered all over the district at least twice every year, there are few places in Backergunge I have not visited repeatedly.

Shortly after my arrival I received a letter from my friend, Mr. G. A. J. Rothney, of the firm of Messrs. John Dickinson and Co., 65, Old Bailey, who has a very wide experience of India, and takes a keen interest in natural phenomena, asking me to try and elucidate this phenomenon of the Barisal Guns; to make careful observations and record them on the spot. This I did, and I now forward a copy of the note I sent him.

The causes usually assigned for this phenomenon are three in number, viz. :—

- (1) High banks of rivers falling in ;
- (2) Surf breaking on the shore, and
- (3) Subterranean explosions.

The first of these theories cannot stand in face of the undisputed fact that any such sound would be purely local and could be heard only at very short distances, whereas it is admitted these guns are heard at places a hundred miles apart. The second is equally untenable when we remember the whole delta is composed of alluvial deposit, without a rock for hundreds of miles. And, thirdly, this alluvial deposit entirely does away with the possibility of subterranean explosions.

It is well known to all navigators of these waters there is a peculiarly deep depression to the south of this delta, which either has never been sounded, or, if sounded, has shown a most unaccountable depth, and it is assumed these reports emanate from this depression. But I am not inclined to accept this as a sufficient explanation, as the sounds are so very irregular in their frequency. We all know that Geysers in various quarters of the globe are celebrated for shooting out great masses of water from time to time; but these usually have some periodicity, and their times for discharge have been, more or less, tested and reduced to some well-known law or theory. Now the very irregularity of the Barisal Guns proves they can be subject to no such law, for, if they were, the phenomenon should be heard with some regularity, whereas, as I have shown in my note to my friend, their irregularity is one of their most noticeable features.

There are two special occasions to which I would draw attention: the first in February, 1891, when from the southernmost outpost, Chaltabuni, I followed the reports for some forty miles out to sea; the second, mentioned in my letter to the Surveyor-General of Bengal, when, in August, 1891, for more than six hours, I followed the reports without getting any appreciably nearer, and also never hearing them to the north of me.

HENRY S. SCHURR.

34, Bloomsbury Street, W.C., November 28.

(Report.)

BARISAL GUNS are heard over a wide range extending from the Twenty-four Pergunnahs through Khulna, Backergunge and Noakhali, and along the banks of the Megna to Naraingunge and Dacca. They are heard most clearly and frequently in the Backergunge district, from whose headquarters they take their name.

These Guns are heard most frequently from February to October, and seldom in November, December or January. One very noticeable feature is their absence during fine weather, and they are only heard just before, during, or immediately after heavy rain.